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FEDERAL-STATE COOPERATIVE

SNOW SURVEYS AND IRRIGATION WATER FORECASTS

for

Platte and Arkansas Drainage Basins

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☆ JUN 6 1950 ☆
U. S. DEPARTMENT OF AGRICULTURE

By

Division of Irrigation, Soil Conservation Service
United States Department of Agriculture
and
Colorado Agricultural Experiment Station

Data included in this report were obtained by the agencies named above in cooperation with the U. S. Forest Service, National Park Service, State Engineers of Colorado, Wyoming and New Mexico and other Federal, State and local organizations.

As of

MAY 1, 1950

May 1, 1950

WATER SUPPLY OUTLOOK
PLATTE-ARKANSAS DRAINAGE BASIN

Final snow surveys for the 1950 season on the Platte and Arkansas drainage basins indicate that the trend shown by previous surveys is continued. The irrigation season runoff of streams is expected to vary from about twice normal on the Sweetwater drainage in Wyoming to about 80 percent of normal on the headwaters of the Arkansas. Summer flow of the North Platte is expected to exceed the average while on the South Platte and its tributaries in Colorado summer flow will be near normal. Soil moisture conditions are fair to good as a result of late April precipitation. Irrigation reservoirs on the South Platte have slightly more water in storage than a year ago. The major reservoirs on the North Platte have a record carryover from last year's heavy flow. Snow cover on the Arkansas Drainage is less than average.

CHEYENNE RIVER

The water supply outlook for the Belle Fourche project and other irrigated areas near the Black Hills in South Dakota and Wyoming is excellent. Streamflow is well above normal due to heavy snow in March. Soil conditions in irrigated districts are good. Recent precipitation has been above normal. Storage in Belle Fourche Reservoir is now 141,000 as compared to 145,000 on May 1, 1949. Storage has increased about 50,000 acre-feet during April.

NORTH PLATTE RIVER

On the source of the Sweetwater River southwest of Lander, the mountain snow cover has been higher than for any date since snow surveys were started in 1936. It was almost twice normal on May 1. On the North Platte drainage in Colorado and Wyoming the snow is 15 percent above normal for May 1, and is generally above May 1 a year ago. The summer runoff is not expected to reach last year's total because of less snow accumulation earlier in the season. In North Park and at higher elevations above Saratoga, Wyoming, there was about two inches of snow at the end of April. Soil moisture conditions in eastern Wyoming are fair to good but are poor in irrigated districts of Western Nebraska. Storage in the North Platte reservoir is at a record level with a total of about 1,788,000 acre-feet as compared to 1,400,000 a year ago. In Kingsley reservoir on the North Platte in Nebraska the storage is now 1,838,000 acre-feet.

On the Laramie River the snow cover is slightly above normal and the summer runoff in this stream should be a little above average but much less than for last year. Month-end precipitation in the Laramie and Wheatland areas has been well above average and soil moisture conditions have improved.

Miscellaneous Series Paper No. 469, Colorado Agricultural Experiment Station

Wheatland Reservoirs now have about 55,000 acre-feet in storage as compared to 51,000 a year ago.

SOUTH PLATTE RIVER

Snow cover on the headwaters of the South Platte and its tributaries in Northern Colorado was slightly above normal on May 1 due largely to storms at the end of April. Summer runoff from these streams should be near average for this season. Since an average runoff is not adequate to supply irrigation needs in a dry summer, the amount of rainfall during the summer months in irrigated areas will be a major factor in the water supply this year. In respect to average the summer flow on the South Platte above Denver and Clear Creek may be a little above while the flow of Boulder Creek and the Saint Vrain, Big Thompson and Poudre Rivers will be near average. The flow of all these streams will be much less than for the 1949 season. Due to the lack of snow at lower mountain elevations streamflow will probably remain below normal till the end of May. Soil moisture conditions in the South Platte Valley near the mountains are now fair to good but are poor from Fort Morgan on to Nebraska. Storage in irrigation reservoirs is generally slightly above May 1, 1949.

Ground-water levels in the South Platte basin are generally higher than for a year ago. Along the South Platte River the rise was from 1 to 3 feet except near Brighton and Sterling where there was little change. In the upper pumping area along Box Elder Creek there was a lowering of up to 1½ feet but the position of the water table is normal. Elsewhere on this drainage the water table is ½ to 1½ feet higher. A continued rise occurred in Prospect Valley reaching a maximum of 6 feet in the central position. The usual decline in the Bijou and Kiowa Valleys in Morgan County was not in evidence during the past year. In the Cache la Poudre Valley the water table is from ½ to 2 feet higher. North of Greeley on Lone Tree Creek there were both declines and gains of from ½ to 1 foot.

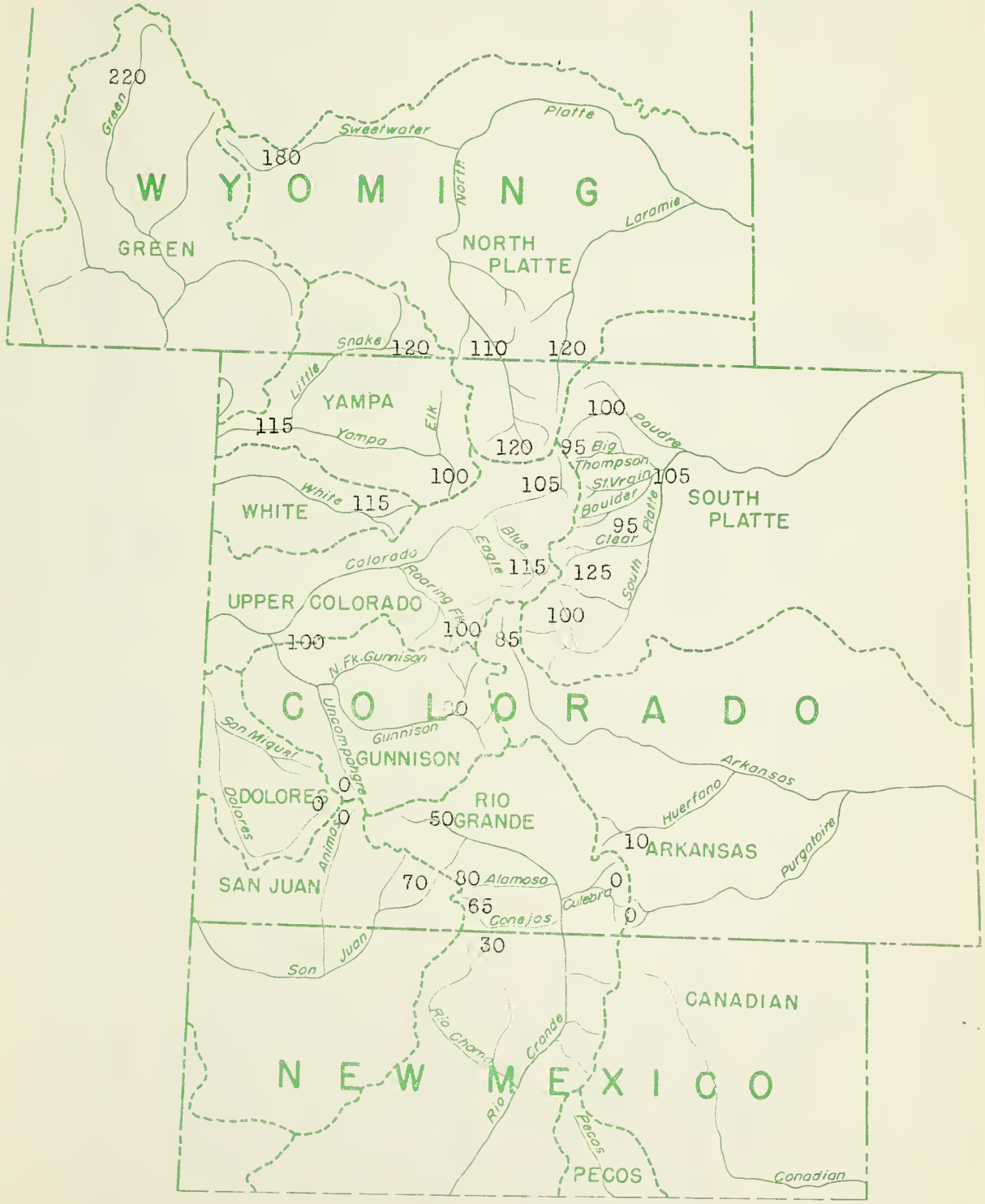
ARKANSAS

The water supply outlook on the Arkansas River is not as favorable as in northern Colorado. Summer runoff is expected to be about 85 percent of normal at Salida. Snow cover on the extreme headwaters of this stream has been above normal since April 1. At Marshall Pass and on the headwaters of the Fountain Creek and the Huerfano, Cucharas and Purgatoire Rivers, the snow cover has been extremely low throughout the winter season. Unless there is unusually heavy rainfall this summer the discharge of these streams will be near the minimum of record. Soil moisture conditions throughout the valley are poor. Precipitation has been far below average throughout the winter season. Streamflow is generally less than 50 percent of average.

In the Arkansas Valley there are a few local areas near Avondale and Rocky Ford where the water table is 1 to 1½ feet higher. Elsewhere there is little change from last year.

WATER CONTENT OF SNOW ON THE WATERSHEDS OF PLATTE, ARKANSAS, UPPER COLORADO AND RIO GRANDE BASINS BASED ON SNOW SURVEYS MADE APPROXIMATELY FIRST DAY OF MONTH

In Percent of Normal
May 1, 1950



Note: The above numbers represent actual snow cover on the snow courses on the watershed in percent of normal May 1, 1950. These numbers do not necessarily coincide with expected summer runoff.

PLATTE-ARKANSAS DRAINAGE BASINS
STREAM FLOW FORECASTS, May 1, 1950

Basin and Stream	April-Sept., Incl., Streamflow, Acre Feet				
	Forecast 1950	Measured Runoff 1949	1948	1947	10-year-Avg 1939-1948
NORTH PLATTE					
Sweetwater at Alcova	120,000	87,000	40,000	85,000	57,000
North Platte at Saratoga	725,000	990,000	670,000	761,000	644,000
Medicine Bow near Hanna	135,000	161,000	97,000	150,000	103,000
Laramie at Jelm	90,000	113,000	82,700	123,000	88,000
Laramie at Lookout	80,000	123,000	61,000	124,000	72,000
SOUTH PLATTE					
Poudre at Canon	215,000	323,000	201,000	298,000	233,000
Big Thompson at Drake	85,000*	171,000	95,000	168,000	103,000
Saint Vrain at Lyons	75,000	119,000	64,000	126,000	81,000
Boulder at Orodell	50,000	61,000	45,000	74,000	51,000
Clear Creek at Golden	150,000	185,000	136,000	203,700	137,000
ARKANSAS					
Arkansas at Salida	300,000	460,000	422,000	451,000	344,000
Cucharas at La Veta	7,000		17,000	24,000	18,000
Purgatoire at Trinidad	20,000		68,000	69,500	65,000

*Excluding Diversions

STATUS OF RESERVOIR STORAGE, PLATTE-ARKANSAS BASIN, May 1, 1950

BASIN AND STREAM	RESERVOIR	USABLE CAPACITY (Thous. A.F.)	THOUSANDS ACRE FEET IN STORAGE About May 1,1950				
			1950	1949	1948	1947	10-year Avg.* 1939-1948
MISSOURI RIVER							
Poudre River	Windsor	18.6	11.8	11.7	14.7	12.2	13.3
" "	Cache la Poudre	9.5	8.1	4.6	9.5	8.7	8.3
" "	Fossil Creek	11.6	9.6	6.2	10.8	11.0	8.9
" "	Terry Lake	8.2	4.5	4.6	6.1	5.1	5.3
" "	Halligan	6.4	0.0	0.0	2.5	2.4	2.5
" "	Chamber's Lake	8.8	2.8	2.3	2.7	2.7	3.2
" "	Cobb Lake	34.3	11.3	3.8	5.0	0.6	4.1
" "	Black Hollow	8.0	4.8	2.3	4.2	4.6	3.7
Big Thompson River	Lake Loveland	14.3	5.5	2.4	10.3	2.4	6.8
" " "	Boye Lake	44.0	26.1	21.9	30.1	12.1	17.2
" " "	Lone Tree	9.2	8.2	8.0	9.3	9.3	8.1
" " "	Mariano	5.4	1.7	0.7	4.6	4.6	3.7
St. Vrain River	Union	12.7	9.1	6.1	12.7	6.9	7.8
Boulder Creek	Barker Meadow	11.7		0.5	0.1	0.7	3.0
South Platte River	Eleven Mile	81.9	81.9	81.9	81.9	81.9	79.3
" " "	Cheeseman	79.0	56.4	56.8	79.0	59.0	69.1
" " "	Marston	18.9	15.4	14.4	15.5	16.7	14.3
" " "	Barr Lake	32.2	25.3	26.9	28.5	28.0	24.0
" " "	Milton	24.4	17.6	15.0	20.8	20.2	15.0
" " "	Standley	18.5	11.0	12.5	17.8	12.8	14.6
" " "	Marshall	10.3	2.1	2.0	5.4	5.2	5.9
" " "	Antero	33.0	21.0	20.3	21.0	20.1	15.8
" " "	Horse Creek	20.6	15.2	--	12.5	14.2	10.1
" " "	Riverside	57.5	56.8	55.4	59.4	59.4	50.2
" " "	Empire	37.7	33.3	33.3	34.5	34.9	31.9
" " "	Jackson Lake	35.4	34.4	33.4	35.4	34.4	31.0
" " "	Prewitt	32.8	28.4	27.4	31.2	28.7	24.4
" " "	Point of Rocks	70.0	68.9	51.6	67.3	72.0	62.9
" " "	Julesburg	28.2	21.7	22.7	21.7	22.7	22.4

*Some for shorter periods.

RESERVOIR STORAGE, Cont.

BASIN AND STREAM	Reservoir	USABLE CAPACITY (Thous. A.F.)	THOUSANDS ACRE FEET IN STORAGE ABOUT MAY 1				
			1950	1949	1948	1947	10-year Avg.* 1939-1948
North Platte River	Sutherland		0	31.9	41.0	--	30.0
" " "	Kingsley	2180.0	1838.0	1578.6	1708.0		764.2
" " "	Minatare	60.8	53.0	36.6	48.0	54.2	40.1
" " "	Alcova	190.0	179.2	130.2	166.5	150.4	123.4
" " "	Seminoe	1025.0	601.8	604.5	646.5	405.3	273.2
" " "	Guernsey	49.2	18.9	34.1	22.5	41.8	37.8
" " "	Pathfinder	1045.5	988.4	636.6	700.6	470.4	340.3
Laramie River	Wheatland	70.4	54.9	51.0	90.7	--	42.1
ARKANSAS RIVER							
Arkansas River	Twin Lakes	57.9	12.4	15.4	38.8	15.2	24.2
" "	Sugar Loaf	17.4	6.5	7.1	11.1	8.0	8.3
" "	Clear Creek	11.4	5.8	5.2	8.0	4.4	5.1
" "	Meredith	41.9	0.0	19.5	31.6	26.7	23.7
" "	Horse Creek	26.9	5.2	11.8	17.2	16.0	11.4
" "	Adobe Creek	61.6	22.0	22.5	56.8	38.0	33.1
" "	Cucharas	40.0	2.2	8.0	20.0	2.4	7.4
" "	Two Buttes	40.9	14.0	9.2	4.0	7.9	8.2*
" "	John Martin	655.0	100.9	124.2	99.7	64.9	52.6*
" "	Great Plains	150.0	63.6	84.1	132.1	96.3	62.8
Purgatoire River	Model	15.0	0.2	1.2	4.3	3.4	6.0
CHEYENNE RIVER							
Cheyenne River	Belle Fourche	198.1	141.2	145.5	162.6	156.2	125.2

*Some for shorter periods

SUMMARY OF MAY 1 SNOW SURVEYS AND COMPARISON OF DATA WITH THAT OF PREVIOUS YEARS BY WATERSHEDS

PLATTE-ARKANSAS DRAINAGE BASINS

WATERSHEDS	Snow Depth			Water Content			Number Courses in Average	Snow Density			1950 Water Content in percent of	
	Fourteen Year Avg.*	1949	1950	Fourteen Year Avg.*	1949	1950		Fourteen year Avg.*	1949	1950	Fourteen Year Avg.*	1949
	In.	In.	In.	In.	In.	In.		Percent	Percent	Percent		
PLATTE RIVER												
Sweetwater*	36.3	31.2	57.0	13.1	13.0	23.6	2	36	42	41	189	182
North Platte River	46.5	46.7	53.4	18.9	19.2	20.8	10	41	41	39	114	108
Laramie River	31.1	29.9	38.6	11.0	12.4	12.8	8	35	41	34	116	103
South Platte River**	17.8	16.9	17.2	5.5	4.9	5.5	3	31	29	32	100	112
Crow Creek	8.1	7.4	5.0	2.5	2.9	1.1	1	31	39	22	44	38
Poudre River	34.9	35.3	37.0	12.6	13.9	12.4	6	36	39	34	99	89
Big Thompson River*	53.7	53.4	55.8	18.3	20.9	16.8	2	34	39	30	92	80
St. Vrain River	37.7	42.2	39.0	13.4	16.2	14.5	1	36	38	37	108	90
Boulder Creek	31.2	--	29.3	11.7	--	10.9	2	37	--	37	93	--
Clear Creek	45.9	38.5	51.3	15.5	12.7	19.3	2	34	34	38	125	152
ARKANSAS RIVER	25.0	21.9	15.3	8.6	7.6	5.4	10	34	35	35	63	71

*Some for shorter periods. **Above Denver

P R E C I P I T A T I O N D A T A*

May 1, 1950

WATERSHED	STATE	Precipitation October 1 to April 30	Departure from Normal	Precipitation April	Departure from Normal
		Inches	Inches	Inches	Inches
North Platte	Wyoming	7.91	+0.48	2.29	+0.40
South Platte	Colorado	6.68	-1.45	2.36	- .07
Arkansas	Colorado	5.46	-3.71	1.36	- .93

*Average selected high elevation stations



PLATTE-ARKANSAS RIVERS SNOW SURVEYS
May 1, 1950

Drainage Basin and Snow Course	Location No. and State	Sec.	Twp.	Range	Elev.	Date of Survey	Snow Depth (Inches)	Snow Cover Measurements: Water Content (Inches) 1950	1949	1948	Past Record: Yrs. of Rec.	Av. Water Content (Inches)
						PLATTE RIVER						
SWEETWATER RIVER												
Grannier Meadows	29 Wyo.	19	30N	100W	9000	5/1	55.8	23.3	13.0	14.7	13	13.8
South Pass*	47 "	13	30N	101W	9000	5/1	58.1	23.8	13.0	14.2	10	12.3
Larsen Creek	57 "	12	30N	103W	9000	5/5	59.2	22.6	8.0		1	
				Average for drainage			57.0	23.6	13.0	14.5		13.1
NO. PLATTE RIVER												
Cameron Pass	1 Colo.	2	6N	76W	10300	4/28	61.0	24.2	24.5	21.4	14	23.7
Park View	7 "	24	5N	78W	9200	5/1	25.5	9.1	7.0	6.3	14	6.9
Columbine Lodge	8 "	21	5N	82W	9300	4/27	49.1	20.8	21.4	22.4	14	16.2
Willow Cr.Pass*	62 "	1	4N	78W	9500	5/1	38.5	15.8	14.1	10.9	12	12.6
Northgate	136 "	8	1N	79W	8500	4/27	4.3	1.3	--	--	--	
Bottle Creek	7 Wyo.	24	14N	85W	8200	4/27	34.3	14.9	6.9	11.7	14	12.6
Webber Spring	8 "	27	14N	85W	9000	4/27	45.2	19.6	16.0	16.0	14	16.6
Old Battle	9 "	29	14N	85W	9800	4/27	88.8	37.7	36.9	34.9	14	32.9
N.French Creek	27 "	27	16N	80W	10200	4/28	96.5	35.1	33.2	27.5	12	32.6
N.Barrett Creek	38 "	30	16N	80W	9400	4/28	66.8	22.1	23.6	18.7	14	21.7
Ryan Park	39 "	34	16N	81W	8400	4/28	28.5	8.5	8.2	7.0	14	7.0
Spring Creek	67 "	32	15N	85W	9000	5/3	49.0	21.1	13.5	--	1	--
Albany	68 "	18	14N	78W	9400	5/2	37.4	12.4	10.4	--	1	--
La Bonte	69 "	11	27N	74W	8450	4/26	0.0	0.0	0.0	--	1	--
Boxelder	70 "	31	30N	75W	9000	4/28	17.0	5.4	--	--	0	--
				Average for Drainage			53.4	20.8	19.2	17.7		18.3

*On adjacent drainage

PLATTE-ARKANSAS RIVERS SNOW SURVEYS
May 1, 1950

Drainage Basin and Snow Course	Location: No. and State	Sec.	Twp.	Range	Elev.	Date of Survey	Snow Depth (Inches)	Snow Cover Measurement: Water Content (Inches) 1950	1949	1948	Past Record: Yrs. of Rec.	Av. Water Content (Inches)
						PLATTE RIVER						
LARAMIE RIVER												
W. Port. G-P. Tun.	4 Colo.	7	8N	75W	8600	4/29	14.2	3.6	3.0	4.6	13	4.0
Deadman Hill*	50 "	26	10N	75W	10200	4/28	50.9	17.4	18.9	16.0	11	16.7
Roach	88 "	5	10N	77W	9800	4/29	73.1	23.2	22.0	24.0	9	19.8
McIntyre	111 "	35	10N	76W	9100	4/30	36.7	11.4	10.5	--	1	
Brooklyn Lake	3 Wyo.	11	16N	79W	10200	5/1	76.4	27.8	27.4	23.1	14	24.3
Fox Park	11 "	21	13N	78W	9200	5/4	9.3	4.7	5.1	10.4	14	5.4
Pole Mtn. #2*	34 "	35	15N	72W	8700	5/1	5.0	1.1	2.9	1.0	13	2.5
Libby Lodge	35 "	29	16N	78W	8700	5/1	31.2	9 2	6.9	7.7	14	4.8
Hairpin Turn	36 "	24	16N	79W	9500	5/1	48.9	15.5	12.8	12.6	14	10.5
Albany	68 "	18	14N	78W	9400	5/1	37.4	12.4	10.4	--	1	--
			Average for drainage				38.6	12.8	12.4	12.5		11.0
CROW CREEK												
Pole Mtn. #2*	34 "	35	15N	72W	8700	5/1	5.0	1.1	2.9	1.0	13	2.5
POUDRE RIVER												
Cameron Pass	1 Colo.	2	6N	76W	10300	4/28	61.0	24.2	24.5	21.4	14	23.7
Chambers Lake	2 "	6	7N	75W	9000	4/30	12.9	3.9	2.5	4.9	14	3.8
Big South	3 "	33	8N	75W	8600	4/30	3.4	1.1	0.1	0.3	14	0.5
Deadman Hill	50 "	26	10N	75W	10200	4/28	50.9	17.4	18.9	16.0	11	16.7
Lake Irene*	65 "	8	5N	75W	10600	4/29	66.6	21.0	26.1	24.2	12	23.6
Hour Glass Lake	68 "	18	7N	73W	9500	4/29	27.4	7.0	11.5	6.6	10	7.3
Red Feather	128 "	26	10N	74W	9000	5/1	10.8	3.2	0.0	--	1	--
			Average for drainage				37.0	12.4	13.9	12.2		12.6
BIG THOMPSON RIVER												
Lake Irene*	65 "	8	5N	75W	10600	4/29	66.6	21.0	26.1	24.2	12	23.6
Hidden Valley	95 "	23	5N	75W	9550	4/29	44.9	12.5	15.6	12.7	9	12.9
Deer Ridge	115 "	19	5N	73W	9050	4/29	7.7	1.5	2.3	--	1	--
			Average for drainage				55.8	16.8	20.9	18.5		18.3
ST. VRAIN RIVER												
Wild Basin	41 Colo.	24	3N	74W	10000	4/28	39.0	14.5	16.2	12.2	14	13.4
Copeland Lake	116 "	21	3N	73W	8600	4/28	1.6	0.7	0.6	--	1	--
Ward	134 "	1	1N	73W	9500	5/1	10.6	3.9	0.0	--	-	--
			Average for drainage				39.0	14.5	16.2	12.2		13.4

*On adjacent drainage

PLATTE-ARKANSAS RIVERS SNOW SURVEYS
May 1, 1950

Drainage Basin and Snow Course	Location					Snow Cover Measurements						
	No. and State	Sec.	Twp.	Range	Elev.	Date of Survey	Snow Depth (Inches)	Water Content (Inches)			Past Record	
								1950	1949	1948	Yrs. of Rec.	Av. Water Content (Inches)
BOULDER CREEK												
E.Port.Moffat T.	5 Colo.	2	2S	74W	9400	4/30	8.3	3.1	1.0	0.8	14	1.6
University Camp	60 "	28	1N	73W	10300	4/27	50.2	18.7	--	25.4	11	21.7
Moffat	133 "	2	2S	74W	9400	4/30	17.6	6.1	--	--	--	
		Average for Drainage					29.3	10.9	--	13.1		11.7
CLEAR CREEK												
Loveland Pass	61 "	27	4S	76W	10600	5/2	42.5	15.5	9.6	14.6	14	12.8
Grizzly Peak*	97 "	2	5S	76W	11250	4/28	60.0	23.0	15.8	20.5	8	18.2
Empire	117 "	21	3S	75W	9650	5/1	19.3	6.0	3.6		1	
		Average for Drainage					51.3	19.3	12.7	17.6		15.5
SOUTH PLATTE RIVER												
Hoosier Pass	14 "	13	8S	78W	11400	5/1	31.1	10.4	9.1	14.0	14	11.0
Fairplay	15 "	33	9S	77W	10000	5/1	0	0	0.0	0.0	14	0.1
Jefferson Cr.	83 "	14	7S	76W	10100	5/1	20.6	6.0	5.7	9.2	13	5.3
Geneva Park	118 "	18	6S	74W	9750	5/1	2.6	1.0	0.0	--	1	
Antero	120 "	1	13S	77W	9200	4/29	0.0	0.0	0.0	--	1	
Deer Creek	130 "	28	6S	78W	8950	5/1	0.0	0.0	0.0	--	1	
		Average for Drainage					17.2	5.5	4.9	7.7		5.5
ARKANSAS RIVER												
Tennessee Pass	19 Colo.	21	8S	80W	10200	4/29	22.2	8.0	3.4	9.3	14	5.3
Twin Lakes T.	21 "	22	11S	82W	10500	5/2	19.0	6.5	7.3	11.3	13	8.9
Marshall Creek*	42 "	24	48N	6E	10800	4/30	13.5	4.6	12.4	12.3	14	10.6
Poncha Creek	43 "	19	48N	7E	10500	4/28	9.6	3.7	9.2	11.7	14	8.7
Whiskey Creek	72 "		37.2N	105.2W	10300	4/30	0.0	0.0	2.0	2.0	12	4.8
La Veta Pass*	74 "	22	28S	70W	9300	5/1	0.0	0.0	2.0	3.1	14	4.1
4-Mile Park	78 "	23	11S	81W	9700	4/29	0.0	0.0	0.0	1.4	12	0.3
Fremont Pass	79 "	2	8S	79W	11400	4/27	57.4	19.2	14.9	20.7	14	16.9
Blue Lakes	81 "	30	31S	69W	10000	5/1	3.4	1.0	7.2	4.7	12	7.4
Monarch Pass	92 "	16	49N	6E	10500	4/27	27.5	11.3	17.5	21.0	9	18.9
St. Elmo	119 "	31	15S	80W	10600	4/28	28.9	16.5	11.3	--	1	
Timberline	121 "	8	9S	81W	11100	4/28	60.1	21.4	21.2	--	1	
Woods Lake	131 "	2	8S	83W	11000	5/2	44.2	17.3	--	--	0	
		Average for drainage					15.3	5.4	7.6	9.8		8.6

*On adjacent drainage

Federal - State - Private

COOPERATIVE SNOW SURVEYS

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Furnishes the basic data necessary for forecasting water supply for irrigation, domestic and municipal water supply, hydro-electric power generation, navigation, mining and industry

"WATER IS THE WEST'S GREATEST RESOURCE"